

Bélair, S., S. Leroyer, N. Seino, L. Spacek, V. Souvanlasy, and D. Paquin-Ricard, 2018: Role and impact of the urban environment in a numerical forecast of an intense summertime precipitation event over Tokyo. *J. Meteor. Soc. Japan*, **96A**, 77-94.

<https://doi.org/10.2151/jmsj.2018-011>

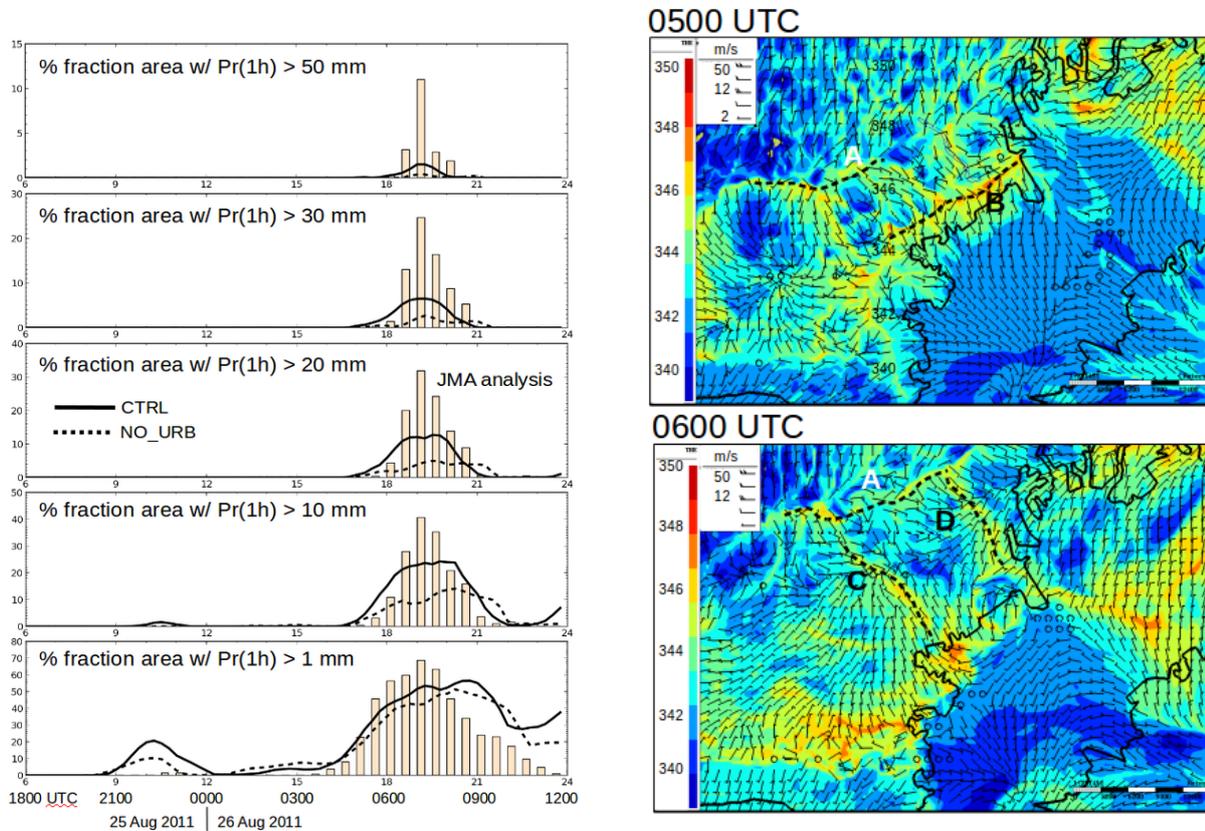


Figure (left): Time series of the areal fractional coverage of hourly precipitation greater than 1, 10, 20, 30, and 50 mm over the greater Tokyo area. The bars indicate results based on JMA's precipitation analyses, whereas the full and dashed black lines are for model runs.

Figure (right): Maps of equivalent potential temperature (K) and winds (m s^{-1}) at approximately 100-m above the surface from the urban experiment, valid at 0500 and 0600 UTC 26 August 2011. The thick dashed lines indicate the location of convergence bands propagating away or parallel to the coast.

- The impact of urbanized surfaces on the development of an intense precipitation event over Tokyo is investigated in this study by comparing two numerical forecasts produced with a 250-m version of the Canadian Global Environmental Multiscale atmospheric model, including a control run with full physics and another without the effect of urban surfaces.
- Results from the two simulations indicate that for this specific case urban areas could lead to an increase of precipitation intensity over Tokyo although they do not appear to have a substantial impact on the timing and overall area of precipitation (Figure on the left).
- Several hypotheses were tested as part of this study. Results show that the precipitation intensification over Tokyo seems to be linked with a strengthening of the horizontal flow of thermodynamic energy at low levels from Tokyo Bay. Another contributing aspect could be linked with the production of low-level waves first propagating away from the Tokyo Bay coast and then in the orthogonal direction (towards the southwest) during the most intense phase of the precipitation event (Figure on the right).